SECTOR COMPETITIVENESS FRAMEWORKS

CONSULTING ENGINEERING HIGHLIGHTS

Industry Sector / Secteur de l'industrie
Service Industries and Capital Projects / Secteur des services et des grands projets

Canada

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The objective of the **Sector Competitiveness Frameworks** series is to seek ways in which government and private industry together can strengthen Canada's competitiveness and, in doing so, generate jobs and growth.

In all, some 29 industrial sectors will be analyzed. *Part 1 — Overview and Prospects* will be available for distribution in printed as well as electronic forms during coming months for the following industries:

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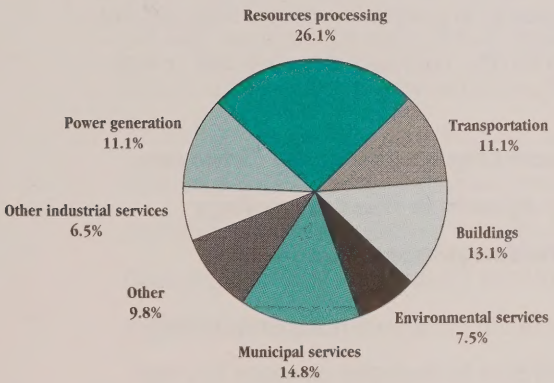
1 HIGHLIGHTS

Canada's consulting engineering industry contributes to the nation's wealth through innovation, design, and development of both industry and public infrastructure ...

- Consulting engineers are skilled professionals who provide independent advice and a wide range of services normally associated with the development and implementation of capital projects.
- Canadian firms have traditionally had a competitive advantage in resource extraction, energy, telecommunications, transport and infrastructure engineering.

What They Do: Sources of Annual Revenue of Canadian Consulting Engineering Firms, 1992
(Total = $5.6 billion)



Source: Statistics Canada survey of engineering and scientific services, March 1996.

- Most Canadian consulting engineering firms are small, privately held and Canadian owned. A growing number are becoming international players.
- Canada's two largest firms, SNC Lavalin Inc. and AGRA Industries Limited, each have over 5000 employees worldwide. In terms of international billings, SNC Lavalin is ranked by *Engineering News Record*, a major U.S. industry journal, as sixth largest in the world in 1994, and AGRA as thirty-first.

The consulting engineering industry is at the leading edge of Canada's move toward a knowledge-based economy ...

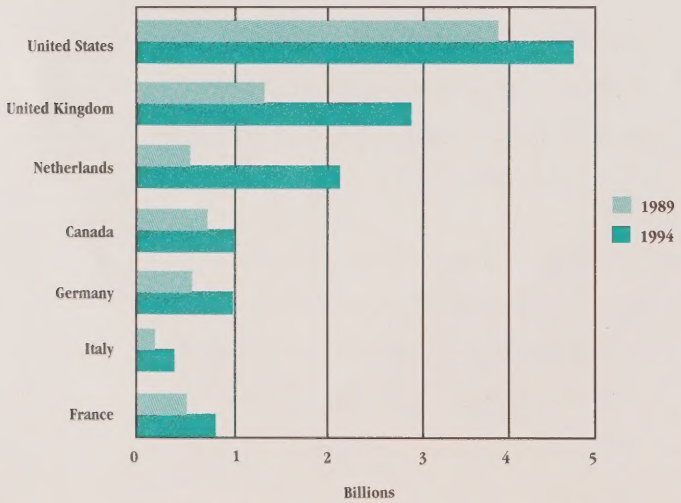
- The industry displays the unique characteristics of a business services industry and is at the leading edge in the movement toward the development of knowledge-based industries in the economy. This stands out clearly in a number of ways, including the way it organizes itself and its labour force.
- Consulting engineering firms are evolving toward a more flexible corporate structure, by maintaining core management and technical competency but relying on associates and specialists for extra help and special expertise during peak times.
- As with many "New Economy" industries, consulting engineering has strong links to other industries and its activities help those industries function more efficiently.

- The major competition facing consulting engineers comes increasingly from other domestic industries as boundaries between industries are dissolving. At the same time, consulting engineers are themselves developing new specialties.

Canada's consulting engineering sector ranks fourth largest in the world in terms of international billings ...

- The United States dominates the global consulting engineering market because of its large domestic market and bilateral aid tied to donor-country sourcing. Other significant world players are the United Kingdom, the Netherlands, Germany and France.

Nations Leading in International Billings Among the Top 200 International Engineering Design Firms



Source: ENR, July 24, 1995.

- Canadian engineers have a reputation for honest evaluation that is trusted by their customers and the international financial community. A growing number of larger firms have the organizational capacity and the human and technological resources to compete effectively around the world.

- They are distinguished internationally by their success in providing consulting services such as design. However, they have been less successful in opening the way for Canadian suppliers to provide construction services, machinery, equipment and products.

- Globally, Canadian engineering companies compete with large, integrated, full-service firms or consortia. Canadian engineers need to strengthen their links to contractors, manufacturers, equipment suppliers and in some cases financial institutions and government agencies to generate the critical mass required to win the more profitable integrated projects.

Consulting engineering firms are key agents in the technology diffusion process ...

- Consulting engineers promote technology diffusion by developing and using their own proprietary technologies in their project design and development work or by borrowing technologies developed elsewhere for use in projects they undertake. As a result, they transfer new technologies embedded in their projects to their clients.

- Few small firms have in-house resources to perform research and development (R&D) other than small-scale applied research in their specialized fields. Most engineering research is carried out through partnerships with universities, government laboratories, non-profit research centres and firms in other industries.

- Official R&D measures appear to understate the industry's contribution to national R&D, because of the difficulty in measuring much of the innovation that takes place on the job as part of the project development and implementation process.

1.1 MAJOR TRENDS

Evolving markets are giving rise to significant challenges ...

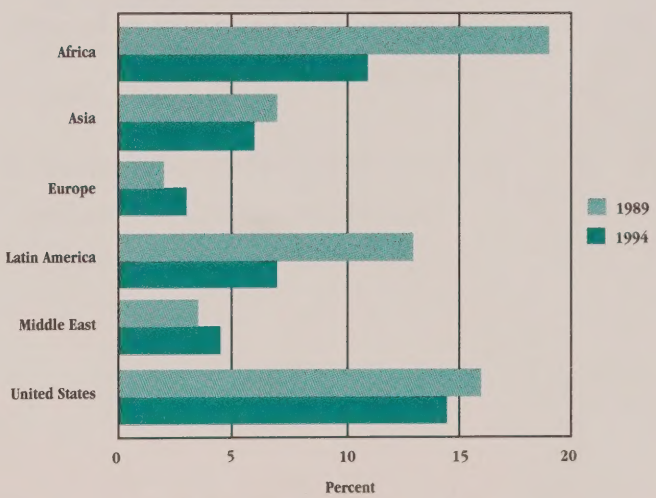
- Significant growth opportunities in the domestic market in the medium term appear limited to the engineering specializations discussed below under "New specializations and skills are required," but opportunities in world markets are enormous. Many of these opportunities are in areas of the Canadian industry's traditional strengths.

- Increasing numbers of capital projects are being completed in design-build, turnkey and varying configurations of build-own-operate-transfer (BOOT). Too few Canadian firms have such capabilities and therefore have not traditionally been very successful in securing such integrated projects. New privatization initiatives by the different levels of government in Canada will provide opportunities to further develop this capacity.

- Those able to transform from a pure engineering to a full-service approach will be in a position to tap into extremely large and rapidly growing international markets. Achieving this will require the development of more effective partnerships and alliances to form consortia capable of taking on and financing major BOOT-type projects.

- Canadian consulting engineers will find significant additional opportunities in global markets. Contributing factors are growing environmental needs, political changes especially in eastern Europe, the North American Free Trade Agreement, privatization of infrastructure projects, and continuing strong economic growth in Latin America and the Pacific Rim.

Canadian Share of Imported Engineering Design Services, Selected Countries, 1989 and 1994



Source: ENR, July 24, 1995.

- Particularly key are the opportunities arising from the global movement toward infrastructure privatization, especially in the less developed countries.

Access to financing needs to be improved ...

- The ability to obtain financing is key to capturing more of the proliferating BOOT-type projects. The Canadian industry will have to develop more innovative financing arrangements and more effective partnerships with financial institutions.

- The major obstacles to both domestic and foreign private financing of integrated projects are the inability of many firms to obtain unencumbered financial leverage, their weak profitability and shortage of in-house multidisciplinary skills.

- Canada is not as successful in winning projects financed by international financial institutions (IFIs), like the World Bank, as are other member countries of the Organisation for Economic Co-operation and Development.

New specializations and skills are required ...

- Consulting engineers able to strengthen their capabilities in advanced manufacturing technologies, systems integration and environmental technologies will be better positioned to tap into new domestic and international markets.

- Despite the involvement of one third of members of the Association of Consulting Engineers of Canada (ACEC) in service exports, only 10% of overall firm revenue comes from exports. Although many more Canadian engineering firms appear to be export ready, they have yet to take the plunge.

- Consulting engineers are increasingly being required to integrate new capabilities into their operations. In addition to advanced technical and computer skills, both young graduates and engineers already in the work force need more sophisticated training in project planning, financing and operating, as well as marketing and image building.

1.2 THE BOTTOM LINE

The following major issues must be addressed by government and the industry working together:

Trade

- Firms need to provide the full range of services associated with design-build, turnkey and BOOT-type projects to win contracts and capture the benefits of downstream business. Success in the future will depend on placing greater emphasis on consortia building based on linkages with a number of key sectors, including the financial sector.
- Given the domestic market outlook, success must be achieved in international markets, particularly in Asia and Latin America, for both IFI and privately funded capital projects, including infrastructure privatization projects.
- A greater number of firms in the industry need to become export oriented in order to take advantage of growing international opportunities.
- Canadian financial institutions must play a stronger role in international project financing.
- The government must achieve a more strategic coordination of its programs and services in support of the international business development interests of the industry.

Human Resources

- Firms must develop new human resources capabilities to strengthen their expertise in new areas of specialization.
- Consulting engineers adopting life-long learning will better retain their competitive skills advantage in domestic and international markets in areas such as technical skills, project management, marketing, business and financial management, and entrepreneurial skills.

Environment

- Consulting engineers must make sustainable development an integrated component of the engineering services they offer.

Technology

- Initiatives are required to strengthen the capabilities of consulting engineering firms in areas such as advanced manufacturing technologies, geomatics, systems integration and environmental technologies in order to offer new consulting services in market growth areas.
- Stronger links are needed between the industry and centres of excellence to ensure more effective technology transfers.

By meeting these challenges, the Canadian consulting engineering industry can maintain its importance in the domestic economy and improve its performance in rapidly growing international markets for capital projects.

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